AGENDA ITEM IRS #2

DATE 3-22-01

Tempe

Memorandum

City Manager's Office

DATE: **March 1, 2001**

TO: **Mayor and Council**

THROUGH: **Shannon L. Wilhelmsen, Government Relations Director (x8401)**

FROM: **Oddvar Tveit, Aviation Coordinator (x8300)**

SUBJECT: **TAVCO – Follow-up Noise Study**

The Tempe Aviation Commission (TAVCO) would like to discuss the attached study by Dr. Bruce D. Merrill on the changes in the perception of aircraft noise in Tempe between 1999 and 2000 at the Issue Review Session March 22, 2001. The study was forwarded to the Mayor and the Council with a memo January 10, 2001. This is a follow up study to the noise survey done by Bruce Merrill in 1999. Both studies were recommended by TAVCO, and were approved by the City Council May 13, 1999. The interviews for this survey were conducted the third week of November 2000, which the surveyor considered was an optimal time range from October 5, 2000 - the date when the third runway at Phoenix Sky Harbor International Airport was opened.

- The study shows significant changes in awareness of aviation noise from when the last survey was conducted in November/December 1999. There are significant increases in the percentages of people in the three survey areas who felt the aircraft noise problem is getting worse. There has been a particularly sharp increase in the areas to the southeast of Apache Boulevard and the areas further south in Tempe.
- There is also a significant increase in the proportion of people who are distinguishing between noise from aircraft landing v. aircraft taking off.

TAVCO-motion

At the last TAVCO-meeting, February 13, 2001 the commission requested that Dr. Bruce Merrill and the staff present and discuss the survey findings with Mayor and Council. The commissioners have accepted the findings of Dr. Bruce Merrill with a comment to (6) page 3, that the noise from arriving aircraft is considered by the commissioners to be an increasing problem for the Tempe neighborhoods.

If you have any questions on this issue, please contact Oddvar Tveit (350-8300) or Shannon Wilhelmsen (350-8401).

Thank You

Attachments:

Bruce Merrill Ph.D. "A Study of Public Perception of Aircraft Noise in Tempe, Arizona between 1999 and 2000" dated December 1, 2000

A STUDY OF THE PUBLIC PERCEPTION OF AIRCRAFT NOISE IN TEMPE, ARIZONA BETWEEN 1999 AND 2000

conducted by:

BRUCE D. MERRILL PH.D.

December 1, 2000

PURPOSE OF THE RESEARCH.

This research was commissioned by TAVCO to determine four objectives.

(1) See if there is a problem with aircraft flying over people's homes in Tempe. If there is a problem, how extensive is it?

(2) What is it about aircraft flying over people's homes that bothers them?

(3) Is aircraft noise more of a problem in some areas of the City than others?

(4) To determine if there have been changes in the perception of aircraft noise in the City of Tempe between 1999 and 2000

METHODOLOGY:

The information in this report is based on telephone interviews with 900 adult heads of household living in Tempe, Arizona. The City was divided into three geographical areas by the Tempe Aviation Commission. The areas were determined by examining landing and take-off patterns associated with Phoenix Sky Harbor International Airport. Three-hundred and fifty (n=300) interviews were taken in each geographic area. A map of the three areas is presented in the report as Appendix A. A brief description of the three areas is given below.

Area One:	North of Apache Boulevard
Area Two:	North of the Superstition Freeway and south of Apache; east of Mill Ave.
Area Three:	Tempe south of the Superstition Freeway

The sampling error for each area when the proportion giving a dichotomous response is 50% and assuming the 95% level of significance is plus or minus 5.6%. Percentages above or below 50% have smaller sampling errors. Sampling errors for a few representative percentages follow:

percentage	error
50	5.6
40	4.5
30	3.4
20	2.3
10	1.3

This study generalizes to adult heads of household living in the city limits of Tempe who are not full-time students of Arizona State University. The initial sampling frame for both the 1999 and 2000 samples was a list of all registered voters living in Tempe. However, when telephone numbers were changed, non-registered voters given the old telephone numbers were included in the sample. Eleven percent (11%) of the sample in 1999 and ten percent (10%) of the 2000 sample was non-registered voters. The Maricopa County Election Department estimates that about fifteen percent of the adult population in Tempe is non-registered.

The questions were developed by the Tempe Aviation Commission with the help of Dr. Bruce D. Merrill the study director. The questions were pre-tested before interviewing. Interviewing was conducted by professional interviewers using a CATI (Computer Assisted Telephone) system. The questions are presented as part of the body of the accompanying report as Appendix B. Interviewing for the 1999 survey was conducted the last week of November and the first week of December, 1999. Interviewing for the 2000 survey was done the third week of November. The data were analyzed using SPSS (Statistical Package Social Sciences). A disc with both the data and program files is available.

It is important to point out one aspect of the interview schedule. In order to insure that respondents would not know why the survey was being conducted, people were first asked what they liked most about living in their neighborhood. The responses to this question were not recorded. By asking people both what they liked and disliked about the area where they lived protected the neutrality of the study.

Difference in Proportions Tests (Z-scores) and Chi Square Analyses were used to determine if the differences reported in the 1999 and 2000 samples were "real" or could have "occurred by chance". Differences that occurred by chance less than five times out of one hundred (an .05 significance level) are indicated by the designation $P<.05$. These differences should be assumed to have been the result of factors other than sampling error.

Dr. Bruce D. Merrill designed and conducted the research. Dr. Merrill holds a Ph.D. in Political Behavior from the Institute for Social Research at the University of Michigan where he trained at the Survey Research Center. Dr. Merrill has conducted literally hundreds of behavioral research studies throughout the United States and several foreign countries. Currently Dr. Merrill is Professor of Mass Communications and Director of the Media Research Program in the Walter Cronkite School at Arizona State University. This research was conducted by Dr. Merrill as a private consultant.

OVERVIEW OF FINDINGS:

(1). Aircraft noise continues to be reported as a problem most often in Area One, which is the area north of Apache Boulevard (see Appendix A). In this area, 34% of the residents, in an open-ended question, mentioned aircraft noise as a problem. In addition, when asked later in the interview how much aircraft flying over the area bothered them, 52% said aircraft noise was frequently (35%) or occasionally (17%) a problem.

(2). There has been an increase in awareness of aircraft noise in all three areas surveyed. In 1999, 21% of the people living in Area One said aircraft noise was a problem. In 2000, 34% reported noise from aircraft as bothersome. In Area Two, the percentage of people reporting aircraft noise as a problem rose from 3% to 12%. In Area Three the increase was from 2% to 8%.

(3). When asked what bothers people the most about aircraft flying overhead, by far the most frequent response in all three areas was "noise", or "noise vibrations". There were no significant changes in the responses to this question between 1999 and 2000.

(4). There were no significant changes between 1999 and 2000 in terms of when, during the day, aircraft noise was most bothersome.

(5). One of the strongest findings of the research is that the proportion of people who can make a distinction between noise during landings and takeoffs has increased significantly from 1999 to 2000. The percentage of people reporting "no difference" dropped from 47% to 27% in Area One, from 55% to 44% in Area Two, and from 79% to 53% in Area Three.

(6). In all three survey areas, noise continues to be more of a problem when aircraft are departing Sky Harbor rather than when landing.

(7). When asked if the aircraft noise problem has been getting better or worse the past few years, there were significant increases in the percentage of people in all three areas who felt the problem is getting worse. In Area One the increase "worse" responses increased from 28% to 37%. In Area Two, from 13% to 26% and in Area three from 8% in 1999 to 14% in 2000.

(8). When asked specifically about aircraft noise the past 12 months, most people (49% in Area One; 58% in Area Two; 70% in Area Three) felt things haven't changed much in the last year. Thirty-three percent (33%) of those living in Area One, 19% living in Area Two, and 8% of those living in Area Three felt the "noise problem" has become worse during the past 12 months.

TABLE ONE

PERCENTAGE OF PEOPLE INDICATING AIRPLANE NOISE WAS BOTHERSOME OR ANNOYING IN 1999 AND 2000

	AREA ONE		AREA TWO		AREA THREE	
	1999	2000	1999	2000	1999	2000
First mention	16%	22%	3%	8%	1%	5%
Second	5%	12%	*	4%	1%	3%
Total mentions	21%	34%	3%	12%	2%	8%
	P<.05		P<.05		P<.05	

This table compares the extent to which airplane noise was perceived as a problem in 1999 and 2000. The question was asked open-ended, that is, no response categories were provided. In addition, the question was "disguised" by first asking people what they liked about where they live. "Disguising" the question prevents respondents from knowing the purpose of the study.

The percentage of people living in Tempe giving an open-ended response that aircraft noise is a problem has increased in the past year. In Area One the increase was from 21% to 34%; in Area Two from 3% to 12; and in Area Three from 2% to 8%. Difference in Proportion Tests (Z scores) were used to determine whether or not the increases could have occurred by chance. As indicated in Table One, the probability that the increases were due to chance was less than 5% (P<.05) in all three areas.

TABLE TWO

COMPARISON OF HOW PEOPLE RESPONDED TO A CLOSED ENDED QUESTION MEASURING HOW OFTEN AIRCRAFT FLYING OVER THE AREA WHERE THEY LIVE IS A PROBLEM

	AREA ONE		AREA TWO		AREA THREE	
	1999	2000	1999	2000	1999	2000
Frequently	31%	35%	9%	11%	6%	4%
Occasionally	17	17	13	21	13	12
Rarely	14	11	19	20	17	19
Never	38	37	59	48	64	65
	100%	100%	100%	100%	100%	100%
	P>.05		P<.05		P>.05	

This table indicates that the frequency Tempe residents report being bothered by aircraft flying over the area where they live, as measured by a closed-ended question, increased only in Area Two. The changes in areas One and Three could have occurred by chance more than five times in one hundred (Chi Square; P>.05).

TABLE THREE

COMPARISON OF HOW PEOPLE RESPONDED TO A CLOSED ENDED QUESTION MEASURING THE EXTENT TO WHICH CARS DRIVING THROUGH THEIR AREA WAS A PROBLEM

	AREA ONE		AREA TWO		AREA THREE	
	1999	2000	1999	2000	1999	2000
Frequently	24%	21%	21%	19%	18%	13%
Occasionally	19	24	26	23	17	20
Rarely	20	20	18	23	27	27
Never	37	35	35	35	38	40
	100%	100%	100%	100%	100%	100%
	P>.05		P>.05		P>.05	

This question was asked as a control question so that the incidence of changes in how often aircraft flying over neighborhoods was seen as a problem could be compared with changes in the perception that cars driving through the same neighborhoods was a problem. As can be seen above, there has been no change in any of the three areas in the past year.

TABLE FOUR

COMPARISON OF WHAT IT IS ABOUT AIRCRAFT FLYING OVER THEIR AREA THAT BOTHERS TEMPE RESIDENTS

AREA ONE

	1999	2000
Noise, noise vibration	79%	70%
Pattern violations	9	7
Flying too low	6	7
Pollution, fumes, soot, odors	3	5
Afraid of crash, safety	1	7
Police, medical helicopters	*	*
Interferes with electronics	*	3
	100%	100%

* Less than one percent

(Chi Square P>.05)

AREA TWO

	1999	2000
Noise, noise vibration	73%	64%
Pattern violations	13	9
Flying too low	7	12
Pollution, fumes, soot, odors	*	6
Afraid of crash, safety	1	8
Police, medical helicopters	5	1
Interferes with electronics	*	*
	100%	100%

* Less than one percent

(Chi Square P>.05)

AREA THREE

	1999	2000
Noise, noise vibration	74%	73%
Pattern violations	1	9
Flying too low	8	11
Pollution, fumes, soot, odors	3	2
Afraid of crash, safety	6	3
Police, medical helicopters	6	*
Interferes with electronics	*	*
	100%	100%

* Less than one percent

(Chi Square P>.05)

TABLE FIVE

COMPARISON OF WHEN DURING THE DAY AIRCRAFT NOISE IS MOST TROUBLESOME

AREA ONE

	1999	2000
1. Morning hours	18%	26%
2. Around midday	2	3
3. Afternoons	7	5
4. Evenings	13	18
5. During the night	7	5
6. All times/no difference	53	43
	100%	100%

AREA TWO

	1999	2000
1. Morning hours	17%	15%
2. Around midday	3	5
3. Afternoons	9	4
4. Evenings	16	19
5. During the night	8	9
6. All times/no difference	47	48
	100%	100%

AREA THREE

	1999	2000
1. Morning hours	12%	14%
2. Around midday	6	3
3. Afternoons	9	6
4. Evenings	23	17
5. During the night	8	7
6. All times/no difference	42	53
	100%	100%

Chi Square P>.05

TABLE SIX

COMPARISON OF WHETHER AIRCRAFT NOISE IF MORE BOTHERSOME DURING TAKEOFFS OR LANDINGS

AREA ONE

	1999	2000
1. During landings	18% (34)	22% (30)
2. Takeoffs	35	51
3. No difference	47	27
	100%	100%

(Chi Square P<.05) Numbers in parentheses are for those who were aware of a difference. In 2000 in Area One, there was an increase in the percentage of residents who distinguished between landings and takeoffs. There was no change regarding whether the noise bothered them more during landings or takeoffs. Takeoffs continue to be perceived as more of a noise problem.

AREA TWO

	1999	2000
1. During landings	16% (36)	17% (30)
2. Takeoffs	29	39
3. No difference	55	44
	100%	100%

(Chi Square P>.05) Numbers in parentheses are for those who were aware of a difference. In Area Two there was increased awareness but no change in the proportion of people who said the noise bothered them more during landings or takeoffs.

	AREA THREE	
	1999	2000
1. During landings	12% (57)	22% (47)
2. Takeoffs	9	25
3. No difference	79	53
	100%	100%

(Chi Square P<.05) Numbers in parentheses are for those who were aware of a difference. In Area Three more people mentioned a difference and more people felt the noise from airplanes bothered them more during takeoffs.

TABLE SEVEN

COMPARISON OF WHETHER AIRCRAFT NOISE APPEARS TO BE GETTING BETTER OR WORSE

	AREA ONE	
	1999	2000
getting better,	9%	8%
getting worse, or	28	37
hasn't changed much the past few years?	55	41
don't know/no opinion	8	14
	100%	100%

(Difference in Proportions testing whether or not airplane noise is getting worse P<.05.) In Area One, there has been an increase in the proportion of people who report aircraft noise getting worse.

AREA TWO

	1999	2000
getting better,	7%	7%
getting worse, or	13	26
hasn't changed much the past few years?	67	52
don't know/no opinion	13	15
	100%	100%

(Difference in Proportion testing whether or not airplane noise is getting worse P<.05.) In Area Two, there has been an increase in the proportion of people who report aircraft noise getting worse.

AREA THREE

	1999	2000
getting better,	7%	8%
getting worse, or	8	14
hasn't changed much the past few years?	65	62
don't know/no opinion	20	16
	100%	100%

(Difference in Proportion testing whether or not airplane noise is getting worse P<.05.) In Area Two, there has been an increase in the proportion of people who report aircraft noise getting worse.

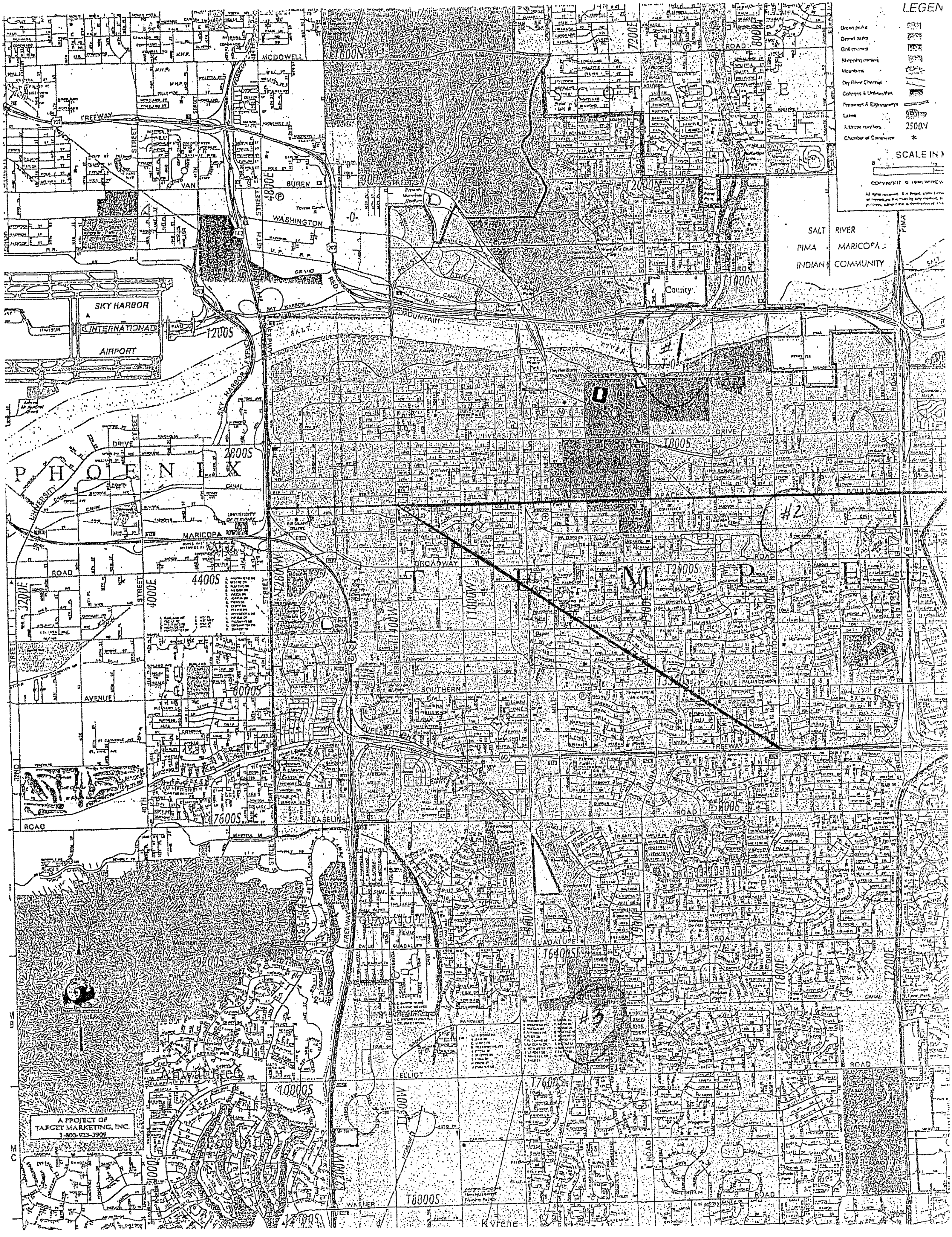
TABLE EIGHT

PERCEPTION OF WHETHER AIRCRAFT NOISE HAS BEEN GETTING BETTER OR WORSE DURING THE PAST TWELVE MONTHS

	AREA ONE	AREA TWO	AREA THREE
getting better,	5%	5%	6%
getting worse, or	33	19	8
hasn't changed much?	49	58	70
Don't know/no opinion	13	18	16
	100%	100%	100%

APPENDIX A

Map of sampling area


LEGEND
Green parks
Desert parks
Golf courses
Shopping centers
Mountains
Dry River Channel
Colleges & Universities
Freeways & Expressways
Lakes
Address numbers
2500N
Chamber of Commerce
SCALE IN
MCDOWELL
FREEWAY
VAN
BUREN
WASHINGTON
GRAND
PAPAGO
SKY HARBOR
INTERNATIONAL
AIRPORT
MOUNTAIN
SALT
RIVER
SALT RIVER
PIMA MARICOPA
INDIAN COMMUNITY
County
P H O E N I X
UNIVERSITY
DRIVE
APACHE
BOULEVARD
MARICOPA
BROADWAY
ROAD
T E M P E
SOUTHERN
AVENUE
SUPERSTITION
FREEWAY
BASELINE
ROAD
GUADALUPE
ELLIOT
WARNER
Kyrene
HAYDEN
SCOTTSDALE
PRIEST
48TH
40TH
STREET
#1
#2
#3
A PROJECT OF
TARGET MARKETING, INC.
1-800-933-3909

APPENDIX B

THE INTERVIEW SCHEDULE

Hello, my name is _____ and I am calling for Dr. Bruce Merrill, an ASU professor who is doing a short but important survey regarding how people feel about living in the City of Tempe. Will you answer just a few questions for us please? Are you an ASU student only living in Tempe during the school year? IF YES: Thank and end interview

1. What is the most important thing you enjoy about where you live in Tempe? (DO NOT CODE)

2. Is there anything that you dislike or that annoys you about where you live?
    1. any mention of AIRCRAFT, noise, low flying, etc.
    2. other

3. Is there anything else that bothers or annoys you?

    1. any mention of AIRCRAFT noise, low flying, etc

Now, thinking about the area where you live, do any of the following bother you, (4) frequently, (2) occasionally, (3) rarely, or (4)never.

4. cars driving through your neighborhood _____
5. aircraft flying over the area where you live _____

IF AIRCRAFT WAS MENTIONED IN QUESTIONS 2, 3 OR 5, ASK Q'S 6 – 9

6. What is it about aircraft flying over your area that bothers you the most? Ask open-ended and code below:

1. Noise, noise vibration
2. Pattern violations
3. Flying too low
4. Pollution, fumes, soot, odors
5. Afraid of crash, safety
6. Police, medical helicopters
7. Interferes with electronics
8. other: specify

7. Is there anything else about aircraft flying over your area that bothers you?

1. Noise, noise vibration
2. Pattern violations
3. Flying too low
4. Pollution, fumes, soot, odors
5. Afraid of crash, safety
6. Police, medical helicopters
7. Interferes with electronics
8. other: specify

8. When you are bothered by aircraft flying over your home, does it happen most often during a particular time of the day? IF YES: When?
Ask open-ended CODE BELOW

1. Morning hours
2. Around midday
3. Afternoons
4. Evenings
5. During the night
6. All times/no difference
7. other: specify

9. Does the noise from airplanes bother you more when airplanes are landing or taking off?

1. During landing
2. Takeoffs
3. No difference
4. Not aware

10. ASK EVERYONE. Does it seem to you that the problem of aircraft flying over your area has been 1. getting better, 2. getting worse, or 3. hasn't changed much the past few years? 4. Don't know/no opinion

11. Thinking now specifically about the past 12 months, does it seem to you that the problem of aircraft flying over your area has been 1. getting better, 2. getting worse, or 3. hasn't changed much? 4. Don't know/no opinion

Memorandum

Tempe

DATE: September 22, 2000

TO: Mayor, City Manager and City Council Members (15 group)

FROM: Oddvar Tveit, Aviation Coordinator (350-8300).

THROUGH: Shannon L. Wilhelmsen, Government Relations Director (350-8401)

SUBJECT: TAVCO Recommendation – Follow-up Noise Study

Introduction

On May 13, 1999 City Council approved a citizen survey that had the following objectives: 1. Determine the effect of commercial aircraft using Phoenix Sky Harbor International Airport on Tempe residents' quality of life in their homes and neighborhoods. 2. Learn more about which factors effect resident's reactions to noise from such aircraft. 3. Collect baseline data so that changes over time can be measured.

The approval included a recommendation to staff to develop a process for a follow-up survey after the third runway was built at Sky Harbor airport.

Dr. Bruce Merrill conducted the survey, which is attached to this memo.

TAVCO-recommendation

At the last TAVCO-meeting, September 12, 2000 a motion was passed, which recommended staff to proceed with retaining Dr. Bruce Merrill to do a follow-up noise study as soon as possible after the opening of the third runway.

Follow-up survey process

Dr. Bruce Merrill recommends performing the follow-up study about 4 weeks after the opening of the third runway. (Aircraft operations on the third runway are scheduled to start October 5, 2000). Dr. Merrill would like to review the scope of work and finalize the interview questions with TAVCO at the next meeting October 10, 2000. Dr. Merrill estimates the survey will cost $12,000. Within the existing mandate from the City Council, staff intends to make a request to Dr. Bruce Merrill for a follow-up citizen survey proposal.

Funding

Funding is available in the current aviation budget.

If you have any questions on this issue, please contact Shannon Wilhelmsen (350-8401) or Oddvar Tveit (350-8300).

Thank You

Attachment:

Bruce Merrill Ph.D. "A Study of Public Perception of Aircraft Noise in Tempe, Arizona" December 14, 1999